REMARKS

Claims 1-30 are pending in this application. Applicants have hereinabove amended claims 1, 13, 15, 16, 23, 28, 29 and 30 and added new claim 31. Claims 3,4,7,10,11,17,18,21,24 and 25 are withdrawn from consideration. Thus, claims 1,2,5,6,7,9,12-16,19,20,22,23 and 26-31 are currently under examination in the subject application.

Support for the amendment to claim 1 may be found, *inter alia*, on page 4, lines 32-33, on page 5, lines 24-26, and lines 29-30 of the subject application.

Support for the amendments to claims 15 and 30 may be found, *inter alia*, on page 4, lines 32-33, on page 5, lines 24-26, and lines 29-30 of the subject application.

Support for new claim 31 may be found, *inter alia*, on page, lines 5-18 of the subject application.

Election of Species

On page 2-3 of the March 23, 2001 Office Action, the Examiner recast the previous restriction requirement as an election of species requirement. The Examiner alleged that this application contains claims directed to the following patentably distinct species of the claimed invention:

I. Genes encoding non-functional portions of an enzyme such as an enzyme involved in carbohydrate biosynthesis, and plants transformed therewith (Claims 1-2, 5-6, 8-9, 12-16, 19-20, 22-23 and 26-30).

II. Genes encoding proteins involved in male sterility and

plants transformed therewith (Claims 3-4, 7, 10-11, 17-18, 21 and 24-25).

III. Genes encoding proteins involved in embryo less seed production and plants transformed therewith (Claims 3, 7, 11, 17, 21, and 25).

The Examiner required applicants to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. The Examiner also indicated that currently, claims 1-3, 5-9, 11-17, 19-23 and 25-30 are generic, and that upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 C.F.R. 1.141.

The Examiner also treated applicants' election of Group I in Paper No. 9 as a response to the above election of species requirement, and included claim 30 in elected Species I.

In response, applicants respectfully submit that the generic claims are patentable for reasons discussed below, and respectfully await examination of all of the claims on the merits.

Rejection under 35 U.S.C. § 112, second paragraph

On page 4 of the March 23, 2001 Office Action, the examiner rejected claims 16 and 29 under 35 U.S.C. 112, second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In response, to expedite prosecution of the subject application, but without relinquishing their right to claim or otherwise pursue patent coverage for the canceled or deleted subject matter, applicants have amended claims 16 and 29 as proposed by the Examiner.

Rejection under 35 U.S.C. § 102 - Lloyd et al.

On pages 4-5 of the March 23, 2001 Office Action, the Examiner rejected claims 15-16 and 28-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Lloyd et al.

The Examiner alleged that Lloyd et al. teach a method for producing a plant having the phenotype of intense pigmentation in above-ground portions and some pigmentation in the roots, said method comprising crossing a first tobacco or Arabidopsis plant containing a heterologous maize R gene with a second tobacco or Arabidopsis plant containing a heterologous maize C1 gene, wherein the R and C1 gene each encode proteins that individually do not confer below-ground pigmentation or above-ground pigmentation to the degree that the plants grown from the seed products of the cross exhibit (the Examiner referred to, e.g., page 1773, paragraph bridging columns 2 and 3, and first full paragraph of column 3; paragraph bridging pages 1773 and 1774).

In response, to expedite prosecution of the subject application, but without relinquishing their right to claim or otherwise pursue patent coverage for the canceled or deleted subject matter, applicants have amended claims 15, 16 and 28-30 to recite that the polypeptides A and B, when expressed in separate plants, do not form an active enzyme, a regulatory protein or a protein which affects the functionality and/or viability and/or the structural integrity of a cell, but when expressed in the same plant do form an active enzyme, a regulatory protein or a protein

which affects the structural integrity of a cell.

Lloyd *et al.*, on the other hand, describe plants expressing C1 gene products and plants expressing R gene products. C1 gene products are described as transcriptional activators and R gene products are described as transcriptional regulators. There is no indication in the application that the C1 transcriptional activator and R transcriptional regulator do not function as regulatory proteins in the plants in which they are expressed. Indeed, the R protein and absence of the C protein is described to confer some above ground pigmentation (see, e.g. page 1773, third column, first paragraph). Therefore, the R protein is an active protein. Accordingly, the R and C1 gene in Lloyd et al. are regulatory proteins when expressed in separate plants and, therefore, do not satisfy the recitations of the amended claims.

In view of the foregoing, the rejection under 35 U.S.C. § 102 based on Lloyd et al. should be reconsidered and withdrawn.

Rejection under 35 U.S.C. § 102 - Krizek et al.

On page 5 of the March 23, 2001 Office Action, the Examiner rejected claims 15-16, 26 and 28-30 under 35 U.S.C. 102(b) as allegedly anticipated by Krizek et al.

The Examiner alleged that Krizek et al. teach a method for producing a plant having the phenotype of two whorls of petals, earlier flowering, and some conversion of leaves to petals, said method comprising crossing a first Arabidopsis plant, containing a heterologous APETALA3 gene ligated to a sequence encoding a beta-glucoronidase carrier protein, with a second Arabidopsis plant, containing a heterologous PISTILLATA gene, wherein the AP3 and PI genes each encode proteins that do not individually confer the above phenotypes to the original parent plants (the Examiner

referred to, e.g., page 12, column 1, first full paragraph of column 2; paragraph bridging pages 12 and 13; page 13, column 1, first full paragraph; page 17, column 2, bottom paragraph).

In response, to expedite prosecution of the subject application, but without relinquishing their right to claim or otherwise pursue patent coverage for the canceled or deleted subject matter, applicants have amended claims 15, 16 and 28-30 (claim 26 is dependent on claim 15) to recite that the polypeptides A and B, when expressed in separate plants, do not form an active enzyme, a regulatory protein or a protein which affects the functionality and/or viability and/or the structural integrity of a cell, but when expressed in the same plant do form an active enzyme, a regulatory protein or a protein which affects the structural integrity of a cell.

Krizek *et al.*, on the other hand, describe plants expressing AP3 and plants expressing PI genes. The expression products of AP3 and PI are transcription factors. There is no disclosure in the application that the AP3 and PI proteins do not form regulatory proteins when expressed in separate plants. There is no disclosure within Krizek *et al.*, of proteins or polypeptides which when expressed in separate plants are inactive enzymes or non-regulatory proteins but when expressed in the same plant form an active enzyme or regulatory protein.

In view of the foregoing, the rejection under 35 U.S.C. § 102 based on Krizek et al. should be reconsidered and withdrawn.

Rejection under 35 U.S.C. § 102 - DuPont

On page 6 of the March 23, 2001 Office Action, the Examiner rejected claims 1-2, 9, 14-16, 23, and 28-30 under 35 U.S.C. 102(b) as allegedly anticipated by WO 91/09957 (DUPONT).

The Examiner alleged that DUPONT teaches a method for obtaining a plant with the phenotype of antibiotic resistance via the expression of a functional neomycin phosphotransferase enzyme, said method comprising crossing a first plant, containing a *ere* transgene encoding a recombinase which recognizes *loxP* sites, with a second plant, containing a transgene encoding a neomycin phosphotransferase but interrupted by a polyadenylation signal bounded by two *loxP* sites, wherein the first and second plants are homozygous for said transgenes, wherein the first and the second plant each contain protein-encoding genes but neither the first nor the second plant exhibit the desired phenotype or possess proteins which are solely responsible for the desired phenotype, wherein said method is useful for controlling the environmental exposure of antibiotic marker proteins (the Examiner referred to, e.g., page 17, line 30 through page 18, line 18; pages 39-59).

In response, applicants respectfully traverse the Examiner's position on the ground that NptII is not expressed in the first plants and Cre recombinase of DUPONT is an active enzyme when expressed in a separate plant and outside the recitations of claim 1. Furthermore, if NptII protein would be expressed in the separate plant as required by the claims, it would be an active enzyme and therefore outside of the recitations of claim 1.

Claim 1 of the present application is directed to a first plant which expresses a protein/polypeptide A and a second plant which expresses a protein/polypeptide B. Each of the expressed polypeptides A and B is <u>not</u> an active enzyme, regulatory protein or other defined protein expressed in separate plants. When expressed in the same plant, the polypeptides A and B form an active enzyme, regulatory protein or protein which affects the structural integrity of a plant cell.

WO91/09957 (Dupont) describes a first plant which has a gene encoding Neomycin phosphotransferase (NptII) enzyme and a second plant which expresses Cre recombinase. In plants encoding NptII, no viable NptII RNA transcripts were produced (see, e.g., page 47, lines 21-23), therefore, no protein was expressed. Applicants' claim 1 recites proteins/polypeptides which when expressed in separate plants do not form an active enzyme, regulatory protein or protein which affects the structural integrity of a plant cell. As NptII is not expressed in the first plants disclosed in WO91/09957 they do not satisfy the recitations of claim 1.

Regarding Cre recombinase, this protein is constitutively expressed within plants when expressed alone in a plant and there is no disclosure in the application to indicate that the Cre recombinase is not active. Therefore, WO91/09957 discloses plants having an active Cre recombinase which is in contrast to claim 1 of the present application in which polypeptides or proteins, A, B are inactive when expressed in separate plants.

Accordingly, 1 is novel over WO91/09957, and claims 2, 9, 14-16, 23 and 28-30 are novel for at least the same reasons.

In view of the foregoing, the rejection under 35 U.S.C. § 102 based on WO91/09957 (DUPONT) should be reconsidered and withdrawn.

Rejection under 35 U.S.C. § 102 - NICKERSON

On pages 6-7 of the March 23, 2001 Office Action, the Examiner rejected claims 1-2, 9, 12, 14-16, 23, 26 and 28-30 under 35 U.S.C. 102(b) as allegedly anticipated by WO 95/20668 (NICKERSON).

The Examiner alleged that NICKERSON teaches a method for obtaining a plant with the phenotype of blue staining due to the presence of a functional beta-glucuronidase protein, said method comprising crossing a first plant, containing a transgene encoding a phage T7 RNA polymerase, with a second plant, containing a transgene comprising the phage T7 promoter and a sequence encoding a fusion protein comprising the carrier protein encoded by the tobacco etch virus leader sequence and the GUS protein, wherein the first and second plant are homozygous for the transgenes, and wherein the first and second plant each contain protein-encoding genes but neither the first nor the second plant exhibit the desired phenotype or possess proteins which are solely responsible for the desired phenotype (the Examiner referred to, e.g., pages 18-20 and 46-49).

In response, applicants respectfully traverse the Examiner's position on the ground that both the GUS protein and RNA polymerase of NICKERSON when expressed in separate plants are active enzymes and outside the recitations of claim 1.

Claim 1 of the present application is directed to a first plant which expresses a protein/polypeptide A and a second plant which expresses a protein/polypeptide B. Each of the expressed polypeptides A and B in claim 1 is <u>not</u> an active enzyme, regulatory protein or other defined protein expressed in separate plants. When expressed in the same plant, the polypeptides A and B form an active enzyme, regulatory protein or protein which affects the structural integrity of a plant cell.

WO95/20668 (Nickerson) describes a first plant containing transgenes encoding a T7 RNA polymerase gene and a second plant having a T7 promoter fused to a β glucuronidase gene (GUS).

GUS is an active enzyme and there is no indication from NICKERSON that it would not be active when expressed in separate plants. Both the GUS protein and RNA polymerase when expressed in separate plants are active enzymes and, therefore, do not satisfy the recitations of claim 1.

For these reasons, claim 1 is novel over WO95/20668, and claims 2, 9, 12, 14-16, 23, 26 and 28-30 are novel for at least the same reasons.

In view of the foregoing, the rejection under 35 U.S.C. § 102 based on WO95/20668 (NICKERSON) should be reconsidered and withdrawn.

Rejection under 35 U.S.C. § 103 - Lloyd et al.

On pages 7-8 of the March 23, 2001 Office Action, the Examiner rejected claims 15-16, 19, 23, 26 and 28-30 under 35 U.S.C. 103(a) as allegedly unpatentable over Lloyd et al.

The Examiner alleged that Lloyd et al teach a method for producing a plant having the phenotype of intense pigmentation in above-ground portions and some pigmentation in the roots, said method comprising crossing a first tobacco or Arabidopsis plant containing a heterologous maize R gene with a second tobacco or Arabidopsis plant containing a heterologous maize C1 gene, wherein the R and C1 gene each encode proteins that individually do not confer below-ground pigmentation or above-ground pigmentation to the degree that the plants grown from the seed products of the cross exhibit, as discussed above.

The Examiner acknowledged that Lloyd et al. do not teach parent plants homozygous for the R or C1 genes, the use of tissue-specific promoters, or the use of carrier protein-encoding

sequences or transit peptide-encoding sequences.

However, the Examiner alleged that it would have been obvious to one of ordinary skill in the art to utilize the method for obtaining a desired phenotype as taught by Lloyd et al, and to modify that method by incorporating known tissue-specific promoters or transit peptides, and to further modify that method by incorporating selfing of the parents to ensure homozygosity; given the recognition by those of ordinary skill in the art of the advantages of tissue-specific gene expression for controlled phenotypic change, and given the recognition by those of ordinary skill in the art of the advantages of homozygosity of parent lines for increasing the likelihood that genes of interest will be transmitted through the gametes.

In response, as noted above with respect to the rejection under 35 U.S.C. § 102, applicants respectfully point out that claims 15-16, 19, 23, 26 and 28-30 recite subject matter that is not taught by Lloyd et al. The subject matter is also not suggested by Lloyd et al. Specifically, there is no suggestion in Lloyd et al. to express two polypeptides, e.g. polypeptides A and B, that do not form an active enzyme, a regulatory protein or a protein which affects the functionality and/or viability and/or the structural integrity of a cell when expressed in separate plants, but when expressed in the same plant do form an active enzyme, a regulatory protein or a protein which affects the structural integrity of a cell. Lloyd et al. simply do not offer any teaching or suggestion to make the expressed C1 and R proteins non-regulatory proteins, and indeed Lloyd et al. cannot do so given that the C1 and R proteins encode a transcription activator and regulator respectively.

Accordingly, applicants respectfully request that the Examiner

reconsider and withdraw the rejection under 35 U.S.C. § 103 based on Lloyd et al.

Rejection under 35 U.S.C. § 103 - Krizek et al.

On pages 8-9 of the March 23, 2001 Office Action, the Examiner rejected claims 15-16, 19, 23, 26 and 28-30 under 35 U.S.C. 103(a) as allegedly unpatentable over Krizek et al.

The Examiner alleged that Krizek et al. teach a method for producing a plant having the phenotype of two whorls of petals, earlier flowering, and some conversion of leaves to petals, said method comprising crossing a first Arabidopsis plant, containing a heterologous APETALA3 gene ligated to a sequence encoding a beta-glucoronidase carrier protein, with a second Arabidopsis plant, containing a heterologous PISTILLATA gene, wherein the AP3 and PI genes each encode proteins that do not individually confer the above phenotypes to the original parent plants, as discussed above.

The Examiner acknowledged that Krizek et al. do not teach tissue-specific promoters or homozygosity for the parental lines' gene of interest.

However, the Examiner alleged that it would have been obvious to one of ordinary skill in the art to utilize the method for obtaining a desired phenotype as taught by Krizek et al, and to modify that method by incorporating known tissue-specific promoters, and to further modify that method by incorporating selfing of the parents to ensure homozygosity; given the recognition by those of ordinary skill in the art of the advantages of tissue-specific gene expression for controlled phenotypic change, and given the recognition by those of ordinary skill in the art of the advantages of homozygosity of parent

lines for increasing the likelihood that genes of interest will be transmitted through the gametes.

In response, as noted above with respect to the rejection under 35 U.S.C. § 102, applicants respectfully point out that claims 15-16, 19, 23, 26 and 28-30 recite subject matter that is not taught by Krizek et al. The subject matter is also not suggested by Krizek et al. Specifically, there is no suggestion in Krizek et al. to express two polypeptides, e.g. polypeptides A and B, that do not form an active enzyme, a regulatory protein or a protein which affects the functionality and/or viability and/or the structural integrity of a cell, when expressed in separate plants, but when expressed in the same plant do form an active enzyme, a regulatory protein or a protein which affects the structural integrity of a cell. Krizek et al. offers no teaching or suggestion to make expressed the AP3 and PI proteins non-regulatory proteins, as indeed doing so would be counterintuitive because the AP3 and PI proteins are transcription factors.

Accordingly, applicants respectfully request that the Examiner reconsider and withdraw the rejection under 35 U.S.C. § 103 based on Krizek et al.

Rejection under 35 U.S.C. § 103 - DUPONT

On pages 9-10 of the March 23, 2001 Office Action, the Examiner rejected claims 1-2, 5, 9, 12, 14-16, 19, 23, 26 and 28-30 under 35 U.S.C. 103(a) as allegedly unpatentable over WO 91/09957 (DUPONT).

The Examiner alleged that DUPONT teaches a method for obtaining a plant with the phenotype of antibiotic resistance via the expression of a functional neomycin phosphotransferase enzyme, said method comprising crossing a first plant, containing a *ere*

transgene encoding a recombinase which recognizes *loxP* sites, with a second plant, containing a transgene encoding a neomycin phosphotransferase but interrupted by a polyadenylation signal bounded by two *loxP* sites, wherein the first and second plants are homozygous for said transgenes, wherein the first and the second plant each contain protein-encoding genes but neither the first nor the second plant exhibit the desired phenotype or possess proteins which are solely responsible for the desired phenotype, wherein said method is useful for controlling the environmental exposure of antibiotic marker proteins, as discussed above.

The Examiner acknowledged that DUPONT does not teach the use of a tissue-specific promoter or a carrier protein or transit peptide.

However, the Examiner alleged that DUPONT suggests the use of tissue-specific promoters for the modification of traits of interest such as seed oil content or the carbohydrate content of seeds or fruit (referring to, e.g., page 4, lines 26-34; page 13), and that it would have been obvious to one of ordinary skill in the art to utilize the method for obtaining a desired phenotype as taught by DUPONT, and to modify that method by incorporating known tissue-specific promoters and/or transit peptide-encoding sequences; given the recognition by those of ordinary skill in the art of the advantages of tissue-specific gene expression for controlled phenotypic change, and the suggestion to do so by DUPONT.

In response, as noted above with respect to the rejection under 35 U.S.C. § 102, applicants respectfully point out that claims 1-2, 5, 9, 12, 14-16, 19, 23, 26 and 28-30 recite subject matter that is not taught by DUPONT. The subject matter is also not

suggested by DUPONT. Specifically, as noted above, WO91/09957 (DUPONT) discloses plants having an active Cre recombinase. There is no suggestion, much less any teaching, to make the Cre recombinase inactive. In fact, doing so would be contrary to the goal of the DUPONT document.

Accordingly, applicants respectfully request that the Examiner reconsider and withdraw the rejection under 35 U.S.C. § 103 based on WO91/09957 (DUPONT).

Rejection under 35 U.S.C. § 103 - NICKERSON

On pages 10-11 of the March 23, 2001 Office Action, the Examiner rejected claims 1-2, 5, 9, 12, 14-16, 19, 23, 26 and 28-30 under 35 U.S.C. 103(a) as being unpatentable over WO 95/20668 (NICKERSON).

The Examiner alleged that NICKERSON teaches a method for obtaining a plant with the phenotype of blue staining due to the presence of a functional beta-glucuronidase protein, said method comprising crossing a first plant, containing a transgene encoding a phage T7 RNA polymerase, with a second plant, containing a transgene comprising the phage T7 promoter and a sequence encoding a fusion protein comprising the carrier protein encoded by the tobacco etch virus leader sequence and the GUS protein, wherein the first and second plant are homozygous for the transgenes, and wherein the first and second plant each contain protein-encoding genes but neither the first nor the second plant exhibit the desired phenotype or possess proteins which are solely responsible for the desired phenotype, as discussed above. NICKERSON also suggests the advantages of tissue-specific expression of genes of interest (see, e.g., page 49, lines 2-4).

The Examiner acknowledged that NICKERSON does not teach the use of a tissue-specific promoter with the above system.

However, the Examiner alleged that it would have been obvious to one of ordinary skill in the art to utilize the method for obtaining a desired phenotype as taught by NICKERSON, and to modify that method by incorporating known tissue-specific promoters and/or transit peptide-encoding sequences; given the recognition by those of ordinary skill in the art of the advantages of tissue-specific gene expression for controlled phenotypic change, as suggested by NICKERSON.

In response, as noted above with respect to the rejection under 35 U.S.C. § 102, applicants respectfully point out that claims 1-2, 5, 9, 12, 14-16, 19, 23, 26 and 28-30 recite subject matter that is not taught by NICKERSON. The subject matter is also not suggested by NICKERSON. Specifically, as noted above, in WO95/20668 (NICKERSON) the T7 RNA polymerase is an active enzyme. There is simply no suggestion, much less a teaching, to make the polymerase inactive. There is no suggestion to express an inactive RNA polymerase, and indeed doing so appears contrary to the goals of NICKERSON.

Accordingly, applicants respectfully request that the Examiner reconsider and withdraw the rejection under 35 U.S.C. § 103 based on WO95/20668 (NICKERSON).

Rejection under 35 U.S.C. § 103 - ALKO GROUP, OY ALKO & Hiatt

On pages 11-14 of the March 23, 2001 Office Action, the Examiner rejected claims 1-2, 5-6, 8-9, 12-16, 19-20, 22-23 and 26-30 under 35 U.S.C. 103(a) as allegedly unpatentable over WO 96/00789 (ALKO GROUP) taken with WO 93/17093 (OY ALKO AB) and Hiatt et al (1989).

The Examiner alleged that ALKO GROUP teaches the transformation of plants with genes encoding yeast proteins involved in the synthesis of trehalose, including the trehalose phosphate synthase gene and the trehalose phosphate phosphatase genes, wherein the introduction of both genes results in high levels of trehalose production, particularly in plants that do not possess high levels of native phosphatase activity, and wherein most plants do not possess either trehalose synthesis enzyme or the ability to synthesize trehalose; and ALKO GROUP also teach that each trehalose synthesis enzyme is comprised of individual subunits and is subject to regulation by another gene, and that trehalose production increases the structural integrity of cell membranes and contributes to cold tolerance and drought tolerance, but may cause some deleterious effects on plants which are not exposed to these conditions; and ALKO GROUP also suggests the use of tissue-specific promoters for the controlled expression of the trehalose biosynthesis genes in order to sequester the product into the organs which require it, while avoiding the deleterious effects on plant growth in general; and ALKO GROUP also suggest the use of cross-breeding to introduce the individual trehalose biosynthesis or regulatory genes, each present in an individual parent which is unable to synthesize trehalose, into a progeny plant which would possess all working proteins and synthesize trehalose. (Referring to, e.g., pages 1-5, 7, 9, 11-13, 16-18, 21-22, 26-28 and 31-32.)

The Examiner acknowledged that ALKO GROUP does not actually teach the crossing of plants each containing individual trehalose biosynthesis genes or genes encoding subunits thereof, the use of transit peptides or carrier peptides, artificially split enzymes, homozygosity of the parents, or protein dimerization regions.

However, the Examiner alleged that OY ALKO AB teaches that each yeast trehalose biosynthesis enzyme is comprised of subunits encoded by different genes, the existence of a regulatory protein encoded by yet another gene, and the ability of trehalose to confer stress tolerance to organisms containing it; and suggests plant transformation therewith for tissue-specific accumulation of trehalose (referring to, e.g., pages 8-9, 16-21, 40-46, 48-58, 69-70, 72-76 and 79-80).

The Examiner also alleged that Hiatt et al. (1989) teach the use of targeting sequences for the increased stability of subunits of dimeric proteins to be assembled in plants, as well as the advantages of crossing parent plants each containing a single subunit-encoding gene (referring to, e.g., page 77, bottom paragraph of each column).

The Examiner then alleged that it would have been obvious to one of ordinary skill in the art to utilize the method of plant transformation with individual trehalose biosynthesis genes, followed by the combination of each gene into a single plant, for the production of trehalose-producing plants containing active trehalose biosynthesis enzymes and exhibiting a stress-tolerant phenotype not present in the parent plants, as taught by ALKO GROUP; and to modify that method by incorporating the genes encoding the individual subunits of each trehalose biosynthesis enzyme or regulatory protein as taught by OY ALKO AB, and to further modify that method by incorporating sexual crossing rather than sequential or co-transformation as suggested by ALKO GROUP and Hiatt et al, in order to limit the potentially growth-retardant production of trehalose to those hybrid plants which exhibit other desirable characteristics or possess otherwise desirable genotypes, as suggested by ALKO GROUP. Furthermore, it would have been obvious to incorporate tissue-specific promoters and carrier peptides or

transit peptides as suggested by ALKO GROUP, OY ALKO AB, and Hiatt et al. In addition, the Examiner alleged that it would have been obvious to incorporate other well-known sequences such as dimerization domains for facilitating the assembly of the two individual subunits, as suggested by Hiatt et al. The use of homozygous parents to increase the likelihood of transmission of the desirable gene through the gamete is well known, as discussed above; and finally, choice of naturally occurring subunit or artificially split enzyme would have been the optimization of process parameters.

In response, applicants respectfully point out that claims 15-16, 19, 23, 26 and 28-30 recite subject matter that is not taught or suggested by any of ALKO GROUP, OY ALKO AB or Hiatt et al., alone or in combination. Specifically, neither of the three references offer a suggestion, or even the mere motivation, to express in separate plants two polypeptides, e.g. polypeptides A and B, that do not form an active enzyme, a regulatory protein or a protein which affects the functionality and/or viability and/or the structural integrity of a cell, but when expressed in the same plant do form an active enzyme, a regulatory protein or a protein which affects the structural integrity of a cell.

WO96/00789 (Alko Group) describes the enzymes trehalose-6-phosphate phosphatase and trehalose-6-phosphate synthase which are fused to non-constitutive promoters such that the enzymes are only expressed in plants during stressful conditions or when the plant matures. The trehalose-6-phosphate phosphatase and trehalose-6-phosphatc synthase enzymes are active enzymes when expressed separately in plants. In fact, there is no teaching or suggestion to make enzymes inactive nor does doing so appear consistent with the goals of WO96/00789.

WO93/17093 (OY Alko AB) describes the inter-relationship between the

structural genes TSS1, TSL1 and TSL2, and the enzyme trehalose synthase which includes the enzymes trehalose-6-phosphate-phosphatase (TPP) and trehalose-6-phosphate synthase (TPS). The finding that a functional TSS1 gene is required for the expression of both TPP and TPS is disclosed (See page 48, lines 8-9). Moreover, the finding that the expression of TSS1 and TSL1 affects TPS activity and that TSS1 and TSL2 affect TPP is also disclosed. However, there is no teaching or suggestion in this document for expressing TSS1, TSL1 or TSL2 in separate plants to form inactive enzymes, inactive regulatory proteins or inactive proteins which affect the structural integrity of a cell. Moreover, there is no teaching or suggestion in this document to express TSS1, TSL1 or TSL2 such that they do not encode structural proteins when expressed in separate plants and yet still perform the function if inducing TPS/TPP activity in plants expressing these enzymes.

Finally, Hiatt *et al.* do not remedy the deficiencies of WO93/17093 or WO96/00789.

Conclusion

In view of the amendments and remarks hereinabove, applicants maintain that none of the cited references, alone or in combination, teach or suggest applicants' claimed invention. Accordingly, applicants respectfully request that the Examiner reconsider and withdraw the rejections and objection set forth in the March 23, 2001 Office Action and earnestly solicit allowance of all pending claims.

No fee, other than the enclosed $390.00 fee for a two-month extension of time, is deemed necessary in connection with the filing of this Response. However, if any additional fee is required, authorization is hereby given to charge the amount of any such fee to Deposit Account No. 03-3125.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited this date with the U.S. Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.

Gary J. Gershik 8/23/01
John P. White Date
Reg. No. 28,678
Gary J. Gershik
Reg. No. 39,992

Attachment A

(Marked Claims)

1. (Amended) A pair of parent plants for producing seeds comprising:

(i) a first parent plant containing one or more gene sequences encoding a polypeptide or protein A, and

(ii) a second parent plant containing one or more gene sequences encoding a polypeptide or protein B;

wherein the polypeptides and/or proteins A, B, when expressed in separate plants, do not form an active enzyme, a regulatory protein or a protein which affects the functionality and/or viability and/or the structural integrity of a cell, but when expressed in the same plant do form an active enzyme, a regulatory protein, or a protein which affects the structural integrity of a plant cell.

2. (Amended) A pair of plants as claimed in claim 1, wherein the one or more gene sequences from at least one of the ~~parents~~ plants is transgenic.

13. (Twice Amended) A pair of plants as claimed in claim 1, wherein each polypeptide or protein A, B is linked to a protein dimerization domain of a dimeric or multimeric protein ~~sequence~~ that promotes association ~~of~~ between ~~subunits~~ polypeptides or proteins A and B.

15. (Amended) A method for producing a plant having a desired phenotype by virtue of an active enzyme, a regulatory protein or a protein which affects the structural integrity of a cell, the method comprising crossing a first ~~line~~ plant with a second ~~line~~ plant

wherein the first ~~line~~ plant contains one or more gene sequences encoding a polypeptide or protein A but which ~~line~~ plant does not have the desired phenotype and wherein the second ~~line~~ plant contains one or more gene sequences encoding a polypeptide or protein B ~~which is complementary to the polypeptide or protein A but which line does not have the desired phenotype~~ but which plant does not have the desired phenotype, wherein the polypeptides A and B when expressed in separate plants, do not form an active enzyme, a regulatory protein or a protein which affects the functionality and/or viability and/or the structural integrity of a cell, but when expressed in the same plant do form an active enzyme, a regulatory protein or a protein which affects the structural integrity of a cell.

16. (Amended) ~~A~~ The method ~~as claimed in~~ of claim 15, wherein the one or more gene sequences from at least one of the ~~lines is transgenic~~ first and the second plant is a transgene.

23. (Twice Amended) A method as claimed in claim 15, wherein each ~~line~~ of the first and second plants is homozygous with respect to the gene sequence encoding polypeptide or protein A, B, respectively.

28. (Twice Amended) A method as claimed in claim 15, wherein at least one of the ~~lines~~ plants contains, as the one or more gene sequences, heterologous gene sequences.

29. (Twice Amended) A seed ~~or plant obtainable from a pair of plants as claimed in~~ obtained by crossing the pair of plants of claim 1, or a plant obtained from the seed.

30. (Amended) A seed or plant, having a phenotype of an active

enzyme, a regulatory protein or a protein which affects the structural integrity of a cell, which is caused by the combined action of two or more transgenes, ~~not present on the same copy of a chromosome~~ comprising a first transgene encoding a polypeptide or protein A and a second transgene encoding a polypeptide or protein B wherein the polypeptides A and B, when expressed in separate plants, do not form an active enzyme, a regulatory protein or a protein which affects the functionality and/or viability and/or the structural integrity of a cell, but when expressed in the same plant do form an active enzyme, a regulatory protein or a protein which affects the structural integrity of a cell.

31. (New) A seed or progeny plant obtained from the plant of claim 29.